



Supreme Court of the United States.

GEORGE WESTINGHOUSE, JR., ET AL.,
Appellants,

vs.

BOYDEN POWER BRAKE COMPANY ET AL.,
Respondents.

No. 116, October
Term, 1896.

Brief on Behalf of Appellants in Connection With the Memorandum of this Court of January 24th, 1898.

The Court has directed the attention of counsel upon this argument—

“particularly to the inquiry whether, in view of the state of the art, including the patents to Westinghouse, the proceedings in the Patent Office, and its own terms, the patent sued on can be sustained as a patent for a process or method.”

In this brief, we discuss these questions chiefly, referring to our former briefs for more detailed consideration of all the various issues which have arisen.

We understand the memorandum to, in substance, suggest the inquiry whether the patent in suit (Westinghouse Patent No. 360,070) is one to which the rule formulated by this Court in *Morley Sewing Machine Co. vs. Lancaster*, 129 U. S., p. 263, is applicable.

This Court then said (p. 284) :

“But in a pioneer patent, such as that of Morley, with the four claims in question, such as they are, *the special devices set forth by Morley are not necessary constituents of the claim.* * * *”

And again (p. 277) :

“The doctrine thus applicable to a machine patent is of a kindred character with that applied, in this country and in England, to a *patent for a process.*”

This rule has been applied even to the extent of ignoring the literalism of claims, when the justice of the case so requires.

Hoyt vs. Horne, 145 U. S., 302.

We proceed to show :

- 1st. That Westinghouse's Patent in suit is a pioneer one ;
- 2d. That nothing in the prior art impairs the scope of its claims ;
- 3d. That the proceedings in the Patent Office do not limit it so as to permit the escape of the defendant.
- 4th. That the claims are so worded as to make the form of the special devices for carrying out the method of operation unessential ; and hence that the liberal rules governing a patent for a process are applicable.

First Point. *The Westinghouse Patent is a pioneer one.*

(a) The "result" achieved by Westinghouse in the patent in suit was new.

What was the "new result?"

The "NEW RESULT" was a NEW BRAKE HAVING A NEW MODE OF OPERATION AND NEW USES AND CAPACITIES.

The patent says (Rec., p. 782) :

"The object of my invention is to enable the application of brake shoes to car wheels by fluid pressure to be effected with *greater rapidity and effectiveness* than heretofore, more particularly in trains of considerable length, as well as to *economize compressed air* in the operation of braking *by utilizing in the brake cylinders* the greater portion of the volume of air which in former practice was directly discharged into the atmosphere."

Mr. Westinghouse says (Record, p. 116) :

"The construction of 'quick-action' automatic brakes is such as to provide for *all of the requirements of service stopping* equally as well as those functions have heretofore been performed by the 'automatic' brake system, and they are *additionally arranged* so that when 'emergency' stops are made there is *practically no delay* in the full application of the brakes, and there is also a *considerable augmentation of power* as compared with that available in service applications."

"The features of *substantially instantaneous action* and *augmented power* in *emergency* applications constitute the distinguishing features of the quick-action automatic brake as compared with the ordinary automatic brake."

Mr. Barnes says of the feature of augmented force (Record, p. 405) :

"The great increase in safety that resulted from the use of quick action triple valves is apparent, as it was found impossible to use a plain triple valve with a forcible action on long trains."

Mr. Boyden (defendant's expert) says (p. 657):

"In making an application of the brakes (nota 'quick action'), the reservoir pressure would exert about 50 pounds on the piston in the brake cylinder, but when making a *quick* application of the brakes, there would be about ten pounds more exerted on the piston over that exerted from the auxiliary reservoir pressure alone, making in all about 60 pounds pressure."

Mr. Westinghouse says (p. 124):

"The effect of this modification" (discharging train-pipe air into the brake-cylinder) "was to cause a considerable amount of the pressure in the train pipe to pass into the brake cylinder, where it contributed to that regularly supplied by the auxiliary reservoir, augmenting the brake force fully twenty per cent. in emergency or quick-action applications."*

See, also, Newbury (p. 258, x-Q. 346):

"A. As before stated, the brake-cylinder pressure, when making a quick-action or emergency application, with the Westinghouse quick-action triple valve, is about 60 pounds, when main air or train-pipe pressure before the sudden reduction is 70 pounds, while, with the same apparatus, in making a service-stop application, the brake-cylinder pressure is about 50 pounds, with a train-pipe pressure at 70 pounds, as before stated."

The essential characteristics of the "new result" were, therefore, a new brake having combined (1) more rapid and more powerful individual action in emergencies; (2) more rapid serial action; (3) unaltered capacity for "service" work; and (4) a capacity for use,

* It will be observed that Mr. Westinghouse and Mr. Boyden both agree as to the amount of augmented force availed of in "quick action."

Mr. Boyden placed it at an addition of ten pounds to a normal pressure of fifty pounds, which is the same as twenty per cent.

The opinion of the Court of Appeals, at page 875, quotes a remark apparently made in oral argument by one of complainant's counsel to the effect that "quick action" does not involve greater power than "service" action. This remark is only true in the sense that no greater power can be exerted than that which is stored in the main reservoir (70 lb.), but is admittedly inaccurate (as shown by the evidence above) if understood to mean that there is no greater pressure in the brake-cylinders when both train-pipe and auxiliary-reservoir air are utilized. The contrary is the fact, as was fully illustrated by a practical experiment in this Court at the last hearing. The Court of Appeals were, perhaps, misled by an inaccurate remark of counsel.

or exclusion from use, as the engineer may determine under the varying requirements of train-control.

We do not mean that no *part* of this result had been attempted before, nor that suggestions looking *partially* in the required direction had not been made.

As in the case of all other long-desired results, there had been previous attempts.

Westinghouse himself, eight years before, had *tried* to accomplish a *small portion* of the result (by his Patent No. 217,838 of 1879).

We shall deal with this aspect of the case later on.

What we now assert (and it is absolutely uncontradicted) is that as a *practical matter* a "quick-action" brake suitable for use on heavy and long trains (both for emergencies and ordinary use) had never prior to Westinghouse's invention of the patent in suit (in 1887) been in fact produced by any one.

More than that, no one had even contemplated what the *whole* problem was, and even Westinghouse had only attempted to solve a *part* of that problem (by his Patent No. 217,838), and had *failed* in the attempt.

The Court of Appeals decided this when they said (p. 872) of the prior Patents Nos. 217,838 and 220,556 :

"The mechanism of the patents just named did not provide effectively for sudden emergencies, and therefore failed to meet a *great necessity of the service.*"

And Judge MORRIS said (p. 847) :

"It is true that in searching for some device which would give quick action, Westinghouse had, before the date of the patent in suit, conceived the idea that it might be accomplished by venting the train pipe at intervals along the train. He had tried having two or three vents at intervals in the length of the train controlled by electrical apparatus, and also had tried relief valves placed in pipe coupling of each car which would open to the atmosphere and vent the train pipe quickly in case of accident or other sudden release of pressure in the forward part of the train. This was shown in the Westinghouse Patent No. 217,838, July 22, 1879, *but neither of these attempts were successfully applied, and they did not solve the problem of quick action.*"

(b) Westinghouse's invention of the "quick-action" brake was a pioneer or fundamental one, because, as an actual fact, it "lay at the bottom of" (to use the words of this Court in *Cochrane vs. Deener*, 94 U. S., p. 780) the application of power brakes to long freight trains; and, as freight trains are practically always long, it may be said to have lain at the base of modern freight train brake equipment.

Mr. Westinghouse's "quick-action" brake was immediately adopted (p. 132, fol. 198), and, at the time the evidence was given, 125,000 brakes embodying this invention (principally in the improved form of Westinghouse Patent No. 376,837) had been supplied by the complainant company (p. 135, fol. 202), and it is safe to say that, at the present time, more than five hundred thousand freight cars, in the United States alone, are equipped with brakes which use (in the combination of the 1st claim) "an auxiliary valve" controlled by the triple-valve piston, for admitting train-pipe air for "quick-action" (1st claim), or which use (in the combination of the 2d claim)

"a triple valve having a piston which, by a preliminary traverse, admits air from the auxiliary reservoir to the brake-cylinder, and which, by a further traverse, admits air from the train-pipe directly to the brake-cylinder."

At the trials of the Westinghouse brake in suit, the distance in which a 50-car freight train, running at 20 miles per hour could be stopped was reduced to 200 feet, from a previously required distance of 350 feet with the best-known type of brake (Westinghouse, p. 134, fol. 201).

The invention has produced, also, a complete change in passenger car equipment.

Mr. Westinghouse says (Record, p. 132):

"The increased efficiency in train stopping, resulting from the improvements from the invention of the quick-action air-brake, has also been realized in *passenger car brakes*, and a passenger-train can be stopped in a distance from 25 per cent. to 40 per cent. less with the quick-action brakes than when the prior 'automatic' system was used. This important improvement has been taken

advantage of by the principal railroads of the country, and *most of the equipment has been changed from the old to the new type.*" *

See, also, Mr. Barnes' very full statement of the new and great results achieved (Record, p. 404, fols. 628-9).

He concludes as follows (p. 405) :

"With the plain brake, on twelve passenger cars equipped as prior to 1887, at a speed of 40 miles an hour, it required 862 feet to make a stop, while with 20 freight cars, equipped with quick-action triple valves, a stop was made in 459 feet. These results are the average of many experiments.

"With a fifty-car train, such as shown on the drawing, running at 20 miles an hour, it required 1,800 feet to make a stop with hand brakes, while, with the same cars, using the quick-action triple valves, a stop was made in 100 feet. The great increase in safety that resulted from the use of quick-action triple valves is apparent, as it was found impossible to use a plain triple valve with a forcible action on long trains."

Surely, then, within the rule of decided cases, Westinghouse was a pioneer in this new departure.

Such vital and important changes in a great industry arising from the introduction of an invention are characteristic of a "pioneer patent."

If the specific result is essentially new, it is not necessary, to constitute pioneership, that the industry as a whole should be created by the invention.

In *Morley vs. Lancaster* (129 U. S., p. 264), the new point of the invention was the automatic machine for sewing buttons of a particular kind (with heavy heads) on fabric (see p. 273).

In *Consolidated Safety Valve Co. vs. Valve Co.* (113 U. S., 157), the Richardson valve was not the first safety valve, but it was a "pioneer" because it relieved pressure without unduly reducing it.

* The universal equipment of *passenger* cars with the Westinghouse invention proves the great practical value of the *augmented force* and quickened *individual* action of the mechanism of the patent in suit, quite apart from quick *serial* action. No passenger trains are long enough to require the quickened serial action, yet the invention of the patent in suit has been universally applied to them. The very first form of "quick action" apparatus (that of the patent in suit) in which serial action, although quickened, was not sufficiently quickened to avoid disastrous shocks on very long trains was, therefore, adequate of itself to produce a "revolution" in *passenger* service.

In *Clough vs. Barker* (105 U. S., 106), the gas burner of Clough was not the first regulatable gas burner, but it was a pioneer because "Clough was the first person who applied a valve regulation of any kind to the combination to which he applied it."

In *Tilghman vs. Proctor* (102 U. S., 707), Tilghman was not the first person to produce fat acids and glycerine from fatty bodies, but he was a pioneer because he was the first to do it by the action of water at high temperature and pressure.

In *Proctor vs. Beemis*, 36 Ch. Div., 740 (cited in *Lancaster vs. Morley*) the patentee was not the first to automatically supply fuel at intervals to a fire, but he was a pioneer because he was the first to do so "by an intermittent radial action" similiar to the action of a human arm.

In *Winona vs. Deering*, 155 U. S., 286, Steward was not the first to add an adjuster for the butts of grain, but he was a pioneer because he was the "first to invent a *piroted extension* to a butt adjuster."

(c) Westinghouse's invention here in suit is not only a pioneer invention, or one which caused a "new departure" or "revolution" in air brake practice, but it is one which in some respects was admittedly out of the line of previous thought upon the subject. Westinghouse—like all others skilled in the air-brake art—was called upon, in 1887, to devise a brake which would meet the modern conditions of freight train practice, viz., the control by fluid pressure of very heavy and long trains pulled by very heavy locomotives.

No known brake was at that time adequate to meet these conditions (Barnes, pp. 404 and 628).

A brake which was both quicker in serial action from car to car, and also more powerful and quicker in action on individual cars, was required.

Westinghouse solved this new problem by a most surprising expedient. He accomplished *both ends by the same means*. He made a more powerful and quicker acting brake by suddenly discharging ("venting") into each brake cylinder, for emergency stops, the air at *reduced pressure* contained in the train pipe.

Judge MORRIS, in the Circuit Court, well characterized this as a "paradoxical and startling" method of solving the problem. He said (Record, p. 845):

"Now, although quick-action emergency brakes were being sought for, no one before Westinghouse had accomplished this result, and the means by which he accomplished it were entirely novel. Indeed, upon first impression, it is paradoxical and startling to find that, when a *sudden, quick and powerful* application of brakes is needed in the face of impending danger, it is to be obtained by a *sudden large release of the pressure* in the train pipe, to the extent of 15 or 20 pounds below that in the auxiliary reservoir, and that *by using this low pressure air* to operate the brake cylinder, instead of the air under greater pressure stored in the auxiliary reservoir, this remarkably effective application of the brakes is obtained."

And not only was this "*means*" of obtaining quick and powerful action—*i. e.*, by utilizing "train-pipe air" to fill the brake-cylinder—absolutely novel, but even the mechanical instrumentality by which this was done, to wit, utilizing the "further traverse" of the triple valve piston for that purpose, was also a startling and novel expedient, because it was utilizing the very feature which (as admitted by Mr. Hill in his first and principal brief, p. 12) *was the very cause of the impracticability* of quick action on long trains, with the best form of automatic brake previously known.

Mr. Hill then said (p. 12) in his history of the development of air-brakes:

"The triple-valve thus slowly evolved from the original form of Patent No. 141,685, August 12, 1873, to the highly improved form of Patent No. 220,556, October 14, 1879, and in the latter form used by the complainant without further material improvement until the year 1888, was satisfactory for short trains consisting of eight or ten cars or less, but on long trains consisting of forty or fifty cars or more, *it was not only unsatisfactory but absolutely impracticable; and its impracticability resulted from the very fact that the piston had the two traverses* referred to by Mr. H. H. Westinghouse, at the bottom of p. 123, namely, a partial traverse for graduating purposes, and a full traverse for emergency stops."

What can more surely indicate and characterize a fundamental invention than the two features thus admitted to be surprisingly novel, *viz.*, the use of "*low pressure*" train-pipe air to produce *quicker and more powerful* brake action than the higher pressure auxiliary

reservoir air, and the use of the *double* traverse of the piston as the governing feature of the mechanism for producing quick serial action, which had been the very cause why quick serial action, in the best form of prior brakes, had been "absolutely impracticable."

(c) But the pioneer or fundamental character of the Westinghouse invention was *not* only demonstrated by the fundamental change in freight and passenger brake equipment, and by the wide adoption of the invention, and by the surprising conversion of the very means which were the cause of prior failures into an element of success for accomplishing the purpose, but all the adjudications upon this patent have been to the same effect.

Thus Judge MORRIS said in the Circuit Court, in the present case (Record, p. 845) :

"In the domain of quick-action brakes, this device would seem to belong to that class of pioneer inventions the patents for which are to be construed so as to be co-extensive with the real invention, if the language of the claim will permit it."

And, again (p. 847) :

"The problem was not solved ; indeed, the first step in the direction of solving it does not appear to have been taken until the experiments which led to the Westinghouse patent now in suit."

And the Court of Appeals in the present case said (Record, p. 880) :

"That this invention of Westinghouse, thus undefined, is one of the highest value to the public, and that it is a pioneer one in the art of quick-action air brakes is not denied and is conceded. It is conspicuously one of those pioneer inventions which entitle the proprietor to a liberal protection from the courts in construing the claim."

And in the Second Circuit in the suit of *Westinghouse Co. vs. New York Co.* (63 F. R., 962), Judge LACOMBE, referring both to the patent in suit (No. 360,070) and its successor (No. 376,837), said :

"Both of these inventions achieved great necessities and overcame great hindrances ; each is an indispensable part of the bridge which carried railroad car builders from failure to success ; both were products of the inventive genius of the same man ; nothing anticipating either is shown.

* * * * *

"Although No. 360,070 was not declared upon in the earlier suit, it was discussed at great length and its meritoriousness was clearly recognized. The statement of the problem to be solved as it stood prior to January, 1888, and of the contribution of No. 360,070 to that solution, as they are set forth in the opinion above cited, leave no doubt that both the Circuit Court and the Circuit Court of Appeals regarded it as a patent of wide breadth."

Surely, in a case like the present, unless there be some controlling fact or principle of law which has been overlooked by all of the tribunals before whom this question has been in controversy, this is one of those cases of a "machine patent" in which, if the essential elements of the claims be found, the "special devices" set forth by the patentee "are not necessary constituents of the claim," and the rule of construction applicable to it "*is of a kindred character to that applied in this country and in England to a patent for a process*" (*Morley Co. vs. Lancaster*, 129 U. S., p. 263).

See, also,

McCormick vs. Talcott, 20 Howard, 402, 405.

The Barbed Wire Case, 143 U. S., 275.

McCormick Co. vs. Aultman (C. C. A.), 69 F. R., 371, 386.

Second Point. *Nothing in the prior art impairs the scope of the Westinghouse claims.*

Having now shown that, as a practical matter, the invention of Westinghouse here in suit was of a primary or pioneer character, because :

1st. The *result* achieved was new.

2d. It has been largely, if not universally, adopted.

3d. The *means* for producing the result, not only in detail but in general character, were new (viz., venting train-pipe air into the brake cylinder for emergencies, and for emergencies *only*).

4th. The novelty, both in the source of the air pressure and the mechanical means controlling its introduction (the *double* traverse of the piston), was not only novel, but was startlingly and paradoxically so.

We now proceed to consider more in detail the line of inquiry to which our attention has been directed by this Court.

Was there anything in the state of the art, or in what Westinghouse himself had previously done, which impairs the substantial novelty of the invention?

Two, and only two, references are cited in Mr. Hill's brief as having any bearing upon this branch of the case. These are :

(a) The Westinghouse Patent No. 217,838, and

(b) An alleged English patent of one Sanders of 1879 (see Mr. Hill's Reargument Brief, pp. 91, 92).

Neither of these have any importance in limiting Westinghouse's present invention.

A brief explanation will make this apparent.

What was the problem which had been so long before the constructors of railway brake apparatus, and which was solved by the Westinghouse Patent in 1887?

The object sought was to stop a heavy and long freight train *both* in a shorter distance *and* with a quicker serial action from car to car.

This was not a simple problem.

It must be borne in mind that it is not permissible to ordinarily use brakes of such power as to actually stop the rotation of the wheels and cause them to slide upon the track.

While that action may be allowed in great emergencies, where everything must be sacrificed to safety, yet no brake is a practical one which in ordinary use ("service" use) will be liable to produce a sliding of the wheels.

The great disadvantage of the use of brake pressure so great as to produce wheel-sliding has been referred to even in *hand-brake* litigations which have been before this and other courts for the last forty years.

Mr. Westinghouse says (p. 115) :

"To render the operation of brakes, in 'service' stopping, satisfactory and economical, the result of practice has determined that the *amount of braking power should be limited to a degree that will render it possible to operate the brakes without reasonable liability*

of locking the car wheels when in motion. Such a result is objectionable, as by means of it flat spots are worn in the periphery of the wheels, and they are rendered unfit for further service."

(See discussion of this subject by Judge DRUMMOND, in 1863, in *Emigh vs. C., B. & O. R. R.*, 1 Biss., 400, and by Judge MORRIS, in 1881, in *Emigh vs. B. & O. R. R. Co.*, 4 Hughes, 271; and, indirectly, *Railway Co. vs. Sayles*, 97 U. S., p. 554.)

In 1887, however, air brakes had long superseded hand brakes. They were introduced by Mr. Westinghouse twenty years ago or more, and the maximum permissible pressure in the auxiliary reservoir had long been established by practice at seventy pounds. That pressure, *when expanded* into the brake cylinders, produces an effective braking force, for service use, of fifty pounds to the square inch (Newbury, Rec., p. 24, and p. 258, x-Q. 34). Long practice has shown that no greater power than fifty pounds in the brake cylinder can be used in ordinary service operations with satisfactory results.

Now, when the problem of equipping long and heavy freight trains with air-brakes presented itself, and when the question arose as to how such trains were to be stopped, not only *more smoothly*, but in a *shorter distance*, when emergency application was required, the question presented itself of devising a brake which for "service" use *would not* and *could not* exert greater pressure than before, but which should have a capacity *in emergencies only* of acting quicker and with greater power.

As was said by this Court in *Consolidated Valve Co. vs. Crosby Co.*, 113 U. S., page 157:

"This was a problem of the reconciliation of antagonisms, which so often recurs in mechanics, and without which practically successful results are not attained."

The *ideal* brake system might have been understood to be one which should include two separate and distinct brakes; one, a brake of limited maximum power and gentle or moderate application, which would serve all the purposes of every-day operations without injury to the wheels and without jolt or discomfort to the passengers or lading; the other, a brake of materially greater maximum power and of sudden and violent application, held in reserve for use

only in cases of threatened disaster, whereby the train could be brought to a stop in the shortest possible distance. Mr. Westinghouse says on page 124 :

" In fact, theoretical considerations would suggest *two independent brakes of different degrees of power or force* ; one of them to be used *for service operations*, to be *limited in power* to a point that would render the locking of car wheels impossible ; the other to be used only *in emergency or quick stops*, and calculated to exert a much greater force, thereby overcoming the speed of the train in the least possible time and distance."

It was fully recognized by practical railroad men, however, that the difficulties and complications connected with the employment of *two different* brake systems upon the same train were practically insurmountable and prohibitory, and no attempt was therefore made to realize the advantages of such a double system.

It was suggested on the prior argument of this case, in this Court, that greater power might have been secured either by enlarging the auxiliary reservoir under each car, or by storing it with air under higher pressure, or by enlarging the brake cylinder, so as to apply pressure on a larger piston area.

These suggestions were made outside of the proofs, as there is nothing in the record to show that either of these expedients would meet the conditions which confronted the art.

As a matter of fact, consideration of each of these suggested solutions (and for this we must also go outside the record) will show that neither of them can possibly be practicable.

Increased auxiliary reservoir capacity and increased auxiliary reservoir pressure would necessarily increase the power applied at each full "service" application of the brakes, as well as in "quick action." Whatever the maximum brake cylinder pressure may be, *it is the fixed maximum for both service and emergency applications.* But increased pressure is not permissible in service use, without danger of wheel-sliding. If greater pressure were sought for and availed of in *emergency* application by enlargement of the auxiliary reservoir, such greater pressure would also be present in every full *service* application. This,

for the reasons above explained, is impracticable. The limit of pressure to be exerted in *service* applications had been fixed by probably more than twenty years of practice.

Nor would the expedient of enlarging the brake cylinder, so as to increase the area of pressure on the piston, be any more available. A large cylinder is one which, with a given inlet, fills more slowly, just in proportion to its size. A brake, therefore, which would be more powerful because of increased cylinder capacity, would be one which would be *too slow* in application.

Neither one, therefore, of the suggested expedients for solving the problem could, in the nature of things, have been possibly availed of, and there is no hint in the proofs that either of these suggested solutions was ever attempted, either before or since Westinghouse's invention of the patent in suit. In fact, for the reasons above given, they are wholly impracticable.

The problem was how to get quicker action and increased efficiency *with the same reservoir power*—the latter having already reached the maximum limit.

What was Westinghouse's solution?

As above noted, it was of a "startling and paradoxical nature." He did not produce two separate brake systems, but he made a *unitary contrivance with the functions and advantages of two*, and with *none of the complications* involved in the use of two.

He kept the automatic brake, so far as its "service" use was concerned (whether for full stopping or for graduating speed), absolutely intact in every function and mode of operation. It could be applied delicately or with full pressure at will, but it never exceeded the limit of practicable pressure (50 pounds to the square inch in the brake cylinder), without the distinct volition of the engineer in specially manipulating his valve at the engine.

But when an emergency arose, when the train was to be stopped at all hazards and in the shortest possible distance, and when wheel-sliding, with its attendant impairment of the rolling-stock, became of secondary importance, then the engineer possessed the power, and the apparatus which Westinghouse invented possessed

the new capacity of quicker and more powerful action, by the mere throwing wide and suddenly open the engineer's valve, and suddenly reducing the pressure in the train pipe by twenty pounds. By that means, a new port was opened and the air, at reduced pressure, was admitted through a larger aperture into the brake cylinder, thereby *rapidly* filling it, and thereby diminishing the space into which the auxiliary reservoir air, at its higher pressure, had to flow and expand, and thereby, by the use of *both* train pipe and auxiliary reservoir air, the brake cylinder was filled more quickly and with air at a higher pressure (because less reduced by expansion), and, by this same venting of the train-pipe air into the brake cylinder, he *also* simultaneously produced *quicken*ed serial action from car to car (*Newbury*, pp. 257-8, 9, 345 and 346; *Newbury*, p. 23; *Boyd*en, p. 657; *Westinghouse*, p. 124).

We submit that the invention which solved this great and complicated problem, produced this highly useful result, and produced it by such unexpected means, is entitled to every favorable construction which the rules of law permit.

Well did Judge MORRIS say of the prior art (*Record*, p. 847) :

"The problem was not solved; indeed, the first step in the direction of solving it does not appear to have been taken until the experiments which led to the Westinghouse Patent now in suit. The substance of the method then devised is the use of the sudden further traverse of the triple valve piston to open a valve in a manner different from the valve opening made by the preliminary traverse for service braking, thereby admitting train-pipe air to the brake cylinder without its passing through the auxiliary reservoir."

And again (p. 843) :

"The result which Westinghouse was seeking in the new device, described in Patent No. 360,070, was first and principally to vent the train-pipe air at each car so as to quicken the serial action of the brakes from car to car; and, secondarily, to utilize the vented air and not waste its power."

And the Court of Appeals described the object which Westinghouse (first) and the defendants (subsequently) attained in the following words (p. 875) :

"the *common object* being to produce a mechanism by which to secure instantaneously, whenever and *only* when a sudden emer-

gency arose, *such a quickened discharge of compressed air into the several brake-cylinders that each car would simultaneously, and the entire train as a whole, be brought to a sudden halt, but leaving the mechanism already existing for use in ordinary braking unmolested and unchanged.*"

Having thus explained the problem, let us now consider the references relied upon to impair the merit of Westinghouse's "quick-action" invention.

(a) *The Westinghouse Patent No. 217,838 (Record, p. 759).*

This patent undoubtedly suggests the desirability of quick serial action, and makes the statement that, to accomplish this, "it is only necessary to make provision for the simultaneous opening of one or more ports in the air-conduit passages at points not remote from each auxiliary reservoir."

The patent then says :

"For this purpose I arrange at such various parts of the air-conduit or communicating pipes as may be desired, but by preference at the couplings, relief valves of the kind shown in the drawings."

The trouble with this patent and its availability to the defense, in seeking to limit the scope of Westinghouse's claim, is that the patentee had only *half* conceived the problem, and did not provide a practical means for carrying out even that half which he had conceived.

He *thought* that it was "*only* necessary to make provision for the simultaneous opening of one or more ports in the air-conduit passages at points not remote from each auxiliary reservoir," and to do this by means of a "relief valve," such as he described and illustrated.

He was wholly in error even in this partial conception. "Only" doing what he described is valueless.

That way of dealing with the problem does not solve it.

Indeed, Mr. Boyden himself (the principal expert for the defendants) admitted this.

Boyden obtained permission from the Court to test certain valves (Rec., p. 663), and he thereupon tested, in presence of complainant's experts, certain valves which he *claimed* were like

those of Patent No. 217,838, but which he had to admit (Record, pp. 685-690) were *modified* in some particulars, not found in the patent nor apparent from the prior art (p. 685, x-Qs. 301-305).

And he then was compelled to admit (Rec., p. 692) as follows :

" 344 x-Q. Did the tests which you made with the device of Patent 217,838 demonstrate that said device was in any wise practically operative to admit air from the auxiliary reservoir to the brake cylinder by preliminary traverse of the triple-valve piston, and to admit air directly from the main air pipe to the brake cylinder by a further traverse of the triple-valve piston ?

" A. They did not.

" 345 x-Q. Did the tests which you made with the device of Patent 217,838 demonstrate that said device was practically operative to a degree sufficient to warrant you or any other capable air-brake constructor in advising its adoption in practical railway service ?

" A. The tests demonstrated that the device would quicken the action of the brakes ; and they demonstrated to my mind, as I think they would to any one who is skilled in air brakes, that the device of Patent 217,838 could be so arranged and modified to suit the automatic air brake as to make it just as efficient a brake as those now in general use, and one that could be recommended to railroad officials for practical use.

" 346 x-Q. (x-Q. 345 repeated.)

" A. The results produced by the devices of Patent 217,838, *as I tried them*, were not of an efficiency that would justify me in recommending the use of the devices to railroad officials.

" 347 x-Q. Did the tests which you made with the device of Patent 217,838 demonstrate that said device was practically operative to such a degree as to lead you to believe that it would be acceptable to, and accepted by, any competent railroad official for use in practical railroad air-brake service ?

" A. The tests I made with the device of Patent 217,838 demonstrates that the device, as I made them, was not practically operative to be used in service ; but they demonstrated that the device of Patent 217,838 *could be so modified* that it would practically be operative in railroad service. As to being able to get railroad officials to adopt it, that is something I cannot say, as I might be able, then again I might not."

And again (x-Q. 348) :

" A. My opinion is that the device, *as I used it*, would not be acceptable to railroad officials for practical use."

This Court, in *Topliff vs. Topliff*, 145 U. S., page 156, emphatically condemned any such method of endeavoring to anticipate a patent by "modifying" prior contrivances, saying :

"It is not sufficient to constitute anticipation that the device

relied upon might, by a modification, be made to accomplish the function performed by the patent in question, if it were not designed by its maker, nor adapted, nor actually used, for the performance of such functions."

Rebuttal to such evidence was hardly required, but, on the part of the complainant, Mr. Newbury testified on the subject of the operativeness of valve of No. 217,838, as follows (p. 189, Q. 223) :

"A. So far as I can see, the device of the said patent 217,838 is not adapted at all for practical operation in an automatic air-brake system, or, in other words, an attempt to incorporate such mechanism in an automatic air-brake system would simply destroy it and render it utterly worthless as such a system.

"Furthermore, the device shown and described in said patent 217,838 is wholly incapable for any practical use, unless it can be said that the destroying of an automatic air-brake system was practical use, as that is the only purpose which I can see that it would serve."

He then proceeds to give the reasons for this statement, which are wholly uncontradicted.

And Mr. Barnes (p. 405, Q. 699) said :

"A. It is not at all applicable, for the plain reason that it could not be used practically. Such a device so obstructs the feeding or charging process as to prevent its practical application to practical trains.

"It would be impossible to graduate the brakes in a service application, so as to make the necessary difference in the force of applying the brakes."

He then proceeds to give the reasons for these statements.

Mr. Westinghouse says (p. 830) :

"I did not find the devices made by Mr. Boyden to be in strict accordance with the instructions of patent 217,838, but, on the contrary, there were important and wide variations in those structures."

And again (p. 830) :

"A. I have been unable to find anything in the specification or drawings of the patent in question that would justify any departure from the usual practice of a skilled mechanic, in making a structure from the said drawings and specification."

And again (p. 834, Q. 904) :

"904 Q. Taking the valve device as you saw it experimented with, as changed and modified by Mr. Boyden in the particulars you have stated, and in view of the results produced by Mr. Boyden, what is your opinion as to the practical merit or value of said valve device for actual use in controlling freight trains on railroads?"

"A. I agree with the opinion expressed by Mr. Boyden in answer to x-Q. 348, that the device, as he used it, would not be acceptable to railroad officials for practical use.

"905 Q. To what extent, if at all, would your opinion be modified if the valve device was constructed in strict accordance with Patent No. 217,838, instead of deviating therefrom, as used by Mr. Boyden, in the particulars you have specified?

"A. Not in any respect.

"906 Q. Mr. Boyden admits, in answer to x-Q. 305, that it is the fact that, long prior to the institution of this suit, he himself recognized the obvious practical inoperativeness of the device of Patent 217,838. To what extent do you concur on Mr. Boyden's recognition of the obvious practical inoperativeness of this device?

"A. I fully concur with him."

As to Patent No. 217,838, at least, therefore, the Court of Appeals and Judge MORRIS were entirely correct in their finding, viz., that it did not in any way solve the problem involved in "quick action"—*i. e.*, "quick action" serially and individually for emergency use, and unimpaired "service" action—and the more so because the proofs *on both sides* are to that effect.

(b) *The alleged English Patent of one Sanders, of 1879.*

Mr. Hill's brief of reargument contains the assertion (p. 91, foot of page):

"The fundamental law shown in the 1879 patent to Mr. Westinghouse was not first disclosed by him, as it was patented in England (R., p. 68, line 7), March 12, 1879, No. 980, by Sanders."

This is a somewhat unusual statement, for no patent to Sanders is in the record, either of March 12, 1879, or of any other date. Mr. Hill's reference to the record, at page 68, contains no mention of any patent to Sanders.* All that appears at the place in the record referred to is a statement by Mr. Newbury that a certain combination of devices, *not* organized to produce "quick action," *but for some other different purpose*, is found in "British Letters Patent of about the year 1879."

* Although there is no patent of Sanders in the record, we have no objection to saying that a Sanders Patent exists, although we should expect to show, if opportunity offered, that it is not like Westinghouse's, and that it has been fully considered and overruled in other litigations.

Of course it should not have been referred to (*Preston vs. Prather*, 137 U. S., 604).

There is in the record a British Patent of 1879 to Barker (Record, p. 473), and to this, doubtless, Mr. Newbury referred. This patent shows an automatic air-brake mechanism, with the elements named in the questions to Mr. Newbury, but *not so* organized and arranged as by any possibility to produce "quick action," and no one pretends that that apparatus has, or could have, any such effect. No one on behalf of the defendants so contends. The purpose and operation of the Barker apparatus is fully explained on page 476 of the record, and is an entirely different one.

We may conclude, then, in answer to the first branch of the inquiry suggested by this Court, that there is nothing in the state of the art, including the patents to Westinghouse, which impairs the scope of the patent in suit.

Third Point. *We next inquire whether the proceedings in the Patent Office have any effect in limiting the scope of the patent in suit.*

What were the proceedings in the Patent Office?

They appear by the file wrapper of his original application (Record, p. 714).

The patentee presented as the form of his first claim the following :

" 1. In a brake mechanism, the combination of a main air pipe, an auxiliary reservoir, a brake cylinder and a triple valve provided with a device for admitting air directly from the main air pipe to the brake cylinder, substantially as set forth."

The second claim was originally presented in the precise form in which it was finally patented as follows :

" 2. In a brake mechanism, the combination of a main air pipe, an auxiliary reservoir, a brake cylinder, and a triple valve having a piston whose preliminary traverse admits air from the auxiliary reservoir to the brake cylinder, and which, by a further traverse, admits air directly from the main air pipe to the brake cylinder, substantially as set forth."

The Patent Office, on January 14, 1887 (Record, p. 717), alleged that claims 1 and 2 were anticipated by the Boyden Patent No. 280,285, of 1883.

The patentee thereupon, under date of January 19, 1887 (Rec-

ord, pp. 717, 719), amended his first claim to the form in which it was patented, retaining the second claim unaltered, and filed an argument showing that the Boyden invention had nothing whatever to do with the problem of "quick-action."

The claims were subsequently allowed.

When it is remembered, as Judge MORRIS said (Rec., p. 849), "*what was the real invention*," it will be apparent that the amended first claim, which Westinghouse filed as substitute for that first presented, had no limiting effect upon the scope of the patent, and certainly had none upon the second claim, *which was not altered at all*.

The gist of the invention lay in the combination by which the triple valve, *with all of its functions for service use retained*, was supplemented by a port, controlled by the triple-valve piston which in emergency use (and *only* then) was opened for the admission of train-pipe air to the brake cylinder to produce "quick action."

The first claim of the patent, *as originally presented*, did not "particularly point out," as the statute required (R. S., Sec. 4888), this fundamental feature of the invention. It was so phrased as *seemingly* to include an apparatus which was "provided with a (*i. e.*, any) device for admitting air directly from the main air pipe to the brake cylinder," irrespective of the purposes and conditions by and under which said admission was effected.

Hence the Boyden Patent of 1883 was cited by the Patent Office, not because that patent describes a "quick action" brake, nor one which has the remotest effect in limiting the *real* invention of Westinghouse, but solely because it happened to have a passage from train pipe to cylinder in a *different* combination and for an entirely *different purpose*, to wit (p. 776): "for replenishing, *while the brake is on*, the air reservoir on each car, or the brake cylinder when the pressure therein has been *lessened by leakage*."

Now, nothing could be more unlike Westinghouse's "quick action" apparatus in operation, purpose and result than this device of Boyden's.

Hence the attorney, when the inaccuracy of the original wording had been pointed out, amended the first claim so as to clearly distinguish Westinghouse's apparatus from that of Boyden's of 1883, and satisfied the Patent Office that the Boyden apparatus of 1883 had no pertinency whatever in connection with the second claim, which was thereupon allowed.

That the Boyden Patent of 1883 had no relation to "quick action" is admitted by Boyden himself. He said (Record, p. 497, Q. 8) :

"I wish to state here that my 1883 patent was not for a 'quick-action' valve (as that term is now understood)."

And, again (Record, p. 574, x-Q. 195) :

"In the triple valve of Patent 280,285 *no application whatever* of the brakes is effected by the passage of main air pipe air to the brake cylinder, and no main air pipe air is admitted to the brake cylinder until *after* the brakes have been applied, with the maximum rapidity and force within the capacity of the device, *by auxiliary reservoir air alone.*"

And again, on cross-examination, he says :

"I did not wish to imply, nor do I now, that my 1883 patent was for a quick-action valve such as you have stated."

Judge MORRIS found, as a matter of fact, that, as between the Boyden Patent of 1883 and the patent in suit,

"There seems to be no analogy or comparison that can be made between them."

And this ruling was not disturbed by the Court of Appeals.

In the matter of amending the *claims*, there was, therefore, no limitation of the scope of the real invention, but only a more clearly defined statement of that invention as compared with one which had no real relation to it.

The terms of a patent claim are in the nature of the metes and bounds of a deed for land, in that they define the limits of the grant. If the metes and bounds of an original deed, or of an application for a land grant, include more than the grantor could give, and more than the grantee intended to ask for, the metes and bounds must be corrected and limited, but—and this is the rule the benefit of which we invoke—*everything within the corrected metes and bounds belongs to the grantee.*

In formulating the amended first claim all the metes and bounds remained as before, unaltered and unchanged, except one. For "a device," of any kind—which gave a boundary line of too large an extent because it included something which was not "Quick Action"—there was substituted, as respects *that* claim, a new boundary line, which is thus defined:

"an auxiliary valve device, actuated by the piston of the triple valve, and independent of the main valve thereof."

We have shown, as we believe, in our original brief (pp. 38-79), that defendants' quick-action apparatus comes inside or within the correctly stated boundary line thus delineated.

Its "auxiliary valve device" is the valve 22. It is "actuated by the piston (29) of the triple valve," and is "independent of the main valve"—a "service" valve, *i j k*.

(For further discussion of this point see our original brief, pp. 91, 92.)

Another amendment to the specification was that embodied in the amendment of January 19, 1887 (Record, p. 720). In that amendment applicant stated as follows:

"I am aware that a construction in which 'an always open one-way passage' from the main air pipe to the brake cylinder is uncovered by the piston of the triple valve simultaneously with the opening of the passage from the auxiliary reservoir to the brake cylinder has been heretofore proposed."

He thereupon disclaimed that construction as one which involved an operation different from that of his invention.

This "disclaimer" was rather in the nature of an *explanation* than a true disclaimer. It pointed out that the use of an "always open one-way" passage was an entirely different thing from the patentee's construction, in which the passage or port from the train pipe to brake cylinder is *not* "always open one way," but is never open operatively except when it is forcibly opened for an emergency application of the brakes.

Surely here was no limitation of the real invention, nor any impairment of the proper scope of the claims.

The defendants' port under valve 22 is *not* "always open," but is open (at least for effective purposes) *only* in emergencies.

Nor was the argument of the applicant's attorney (Record, pp. 718, 819) one which can be used in the interest of an infringer to narrow the scope of the claims. The whole purpose of that argument was a simple and a single one. It was intended to point out that the Boyden Patent of 1883 had no relevancy whatever to the real invention of Westinghouse, and such was the fact, as it is now conceded by Mr. Boyden.

This Court will not, we believe, impair the just scope and control of the claims for a valuable invention, on any strained construction of the phraseology of the attorney for the applicant, used in the course of showing how totally different Westinghouse's invention was to that of the prior Boyden Patent, which, it is admitted, taught nothing on the subject of "quick action."

In *Societe Anonyme, &c., vs. Rehfus*, 75 F. R., p. 657, Judge ACHESON said :

"That the patent office imposed, and the applicant accepted, the limitation upon which the defendants insist, would be a strained conclusion. *An estoppel is not to be implied from circumstances of doubtful import.* This is a fundamental invention, and, upon well-considered principles, the patentee and his assignees would have the benefit of the doctrine of equivalents in large measure. Looking at the entire proceedings upon Cleret's application, it cannot, I think, fairly be said that either the patent office, on the one side, or the applicant, on the other side, contemplated a limitation which would render the claims practically valueless, and make the grant of the patent a vain thing. Let a decree in favor of the plaintiff in each case be drawn."

In *McCormick vs. Aultman*, 69 F. R., p. 371, the Circuit Court of Appeals (Judge TAFT, delivering the opinion) said (p. 393) of the facts which should limit a pioneer patent, as follows :

"*Nothing* will restrict the pioneer patentee's rights in this regard save the use of language in his specifications and claims which permits *no other reasonable construction* than one attributing to the patentee a positive intention to limit the scope of his invention in some particular to the exact form of the device he shows, and a consequent willingness to abandon to the public any other form should it be adopted and prove useful."

Only one other change in the original application was made. Mr. Westinghouse in his original specifications stated the *fact* that

the valve, which, on being opened, gave *emergency* action, instead of being made *separate* from the main valve of the triple, might be made "integral" herewith, and be "formed by an extension thereof." This is so obviously a mechanical equivalent that the statement of the fact would seem to have been useless and superfluous. But as he did not illustrate this particular modification in his drawing, the Patent Office told him that he must either illustrate it or erase this brief reference to it—such being the Patent Office rule at that time (Hogan, Rec., p. 277). He erased it. This is the whole story. But by no rule of law ever yet enunciated can it be held that the erasure of a description of a mechanical equivalent operates as a disclaimer of such mechanical equivalent. The patentee is always entitled to the full benefit of the doctrine of mechanical equivalents, so far as it may apply, whether he describes them or not. The law gives them to him anyhow.

Winans vs. Demead, 15 How., 330, 342.

Goodyear Co. vs. Davis, 102 U. S., 222, 230.

Clough vs. Barker, 106 U. S., 166, 177, 178.

[See cases cited in our original brief, p. 98, and those above quoted.]

But again, this erasure, no matter whether it had the effect of a disclaimer or not, is irrelevant to the present case, for the reason that the defendants' *emergency* valve 22 is *not* made "integral" with the *service* or "main" valve *i, j, k* of its triple valve. Hence, in any view of the case, defendants' apparatus comes within the metes and bounds of the grant made to Westinghouse in and by the patent in suit.

As to the Patent Office action in granting patents to Boyden, *pending the suit*, such action amounts merely to a Patent Office decision that Boyden had made some patentable improvements on Westinghouse, but the Patent Office has under Act of Congress no jurisdiction of the question as to whether these additional improvements *actually contained* the prior Westinghouse invention. That question, under Act of Congress, belongs to the courts. In fact, the

Patent Office has never even presumed to adjudicate questions of that kind, and even if it had, its action would be *ultra vires* and void.

What is said in the Boyden specifications on this point are nothing more than the voluntary *ex parte* statements of Boyden or his counsel, put in writing and printed at the expense of the United States. The Patent Office had no authority under the law to determine whether such statements were true or not, and therefore no presumption arises from the issue of the Boyden Patents as to whether they are true or not.

[For the law here applicable see cases cited in original brief, pp. 98-100.]

Fourth Point. The final point suggested by the Court now presents itself.

We have shown that nothing in the prior art, nor in the proceedings in the Patent Office, tend to limit the scope of the Westinghouse invention, and the claims which purport to cover it, so as to make inapplicable to them the beneficial rule announced by this Court—that, in the case of pioneer patents, rules of construction are to be adopted analogous to those which prevail in the case of process patents.

We now inquire, are the terms of the Westinghouse claims themselves of a character to admit of the application of this rule?

We respectfully submit that they are.

Westinghouse's first claim calls for the combination with the train-pipe, auxiliary reservoir, brake cylinder, and a triple valve of any of the forms of the old automatic brake apparatus (*Westinghouse says in the patent in suit (Rec., p. 788, line 18) that there were "numerous examples in the art of constructions varying materially in appearance"*), of an "auxiliary valve device" actuated by the piston of the triple valve, and independent of the main valve, for admitting air to apply the brakes, directly from the train pipe to the brake cylinder.

The second claim (specifying the invention, as it correctly may, from another point of view) particularly points out as the invention of the patentee the use (in combination with *any* of the numerous forms of automatic triple-valve brake mechanism) of the "preliminary traverse" of a triple-valve piston to admit air from the auxiliary reservoir to the brake cylinder, and of the "further traverse" of the triple-valve piston *to admit air from the train pipe to the brake cylinder*.

Whether the described intermediate connecting parts are or are not the same is of course immaterial (*Winona Co. vs. Deering*, 155 U. S., 285).

The first claim differs from the second in that it does not *require* a piston with a *double* traverse to be used (the specification suggests a "series of pistons" (Rec., p. 788, l. 17) instead of one), but defines the invention as residing in the use of a valve ["auxiliary" to the main (or "service") valve] for opening the port from the *train pipe* to the brake cylinder.

The second claim defines the invention by another of its important characteristics, to wit, that the triple valve piston is one which has a *double traverse*, and that the preliminary traverse is operative to control the admission of air from the auxiliary reservoir to the brake cylinder, and the further traverse is operative to control the admission of air from the train pipe to the brake cylinder.

The second claim, although literally a claim for a mechanical combination, is yet so phrased as to clearly entitle it to the liberality of scope accorded in analogy to the rule applied to process patents.

In a process patent the claim describes a certain action as taking place and producing a stated result, and the claim is valid to that extent and "irrespective of the particular form of the instrumentalities used" by which the action is effected and the result is produced (*Cochrane vs. Decner*, 95 U. S., 780).

In Westinghouse's second claim the gist of the invention is stated in the sentence which describes the triple-valve piston as acting by its preliminary traverse to open a passage from auxiliary reservoir to brake cylinder, and by its further traverse to open a

passage from train-pipe to brake cylinder. Now, such actions can only take place *by the opening of ports and passages* from the respective sources of air pressure to the brake cylinder, and hence (as pointed out in our supplemental brief, p. 27) such claim is equivalent to the following, viz.:

2. In a brake mechanism the combination of a main air pipe (train pipe), an auxiliary reservoir, a brake-cylinder and a triple valve having a piston whose preliminary traverse (*by opening a port*) admits air from the auxiliary reservoir to the brake-cylinder, and which, by a further traverse (*by opening a port*), admits air directly from the main air pipe (train pipe) to the brake-cylinder, substantially as set forth.

But under *such* a claim, relating to *such* an invention, the *particular valves* and the *particular passageways* are "not necessary constituents of the claim" (*Lancaster Co. vs. Morley, supra*) any more than the particular mechanism for effecting a specified step of a new process is essential to the infringement of that process.

The Telephone Case, 126 U. S., 1.

New Process Co. vs. Maus, 122 U. S., 413.

We submit, then, that the phraseology of the claims themselves, and particularly of the second claim, is such as to entitle the complainant to invoke the rule and breadth of construction analogous to that prevailing in the case of process patents; and this is also true, although the claim be construed strictly as a mechanical combination.

In *McCormick Harvesting Machine Co. vs. Aultman*, 69 F. R., 371, the Circuit Court of Appeals for the Sixth Circuit said (p. 387) (following the Court in *Lancaster vs. Morley*):

"With respect to such a patent, the well-established rule is that the patentee who has, by the success of his patent, pointed out the combination of functions needed to reach the new result, and has claimed the combination of mechanical parts performing those functions, may enjoin the use of another machine producing the same result where the second machine differs from the first only in a substitution, for parts or elements of the patented device, of parts or elements which, though different in form and kind, perform the same functions in substantially the same way. It may be that the substituted parts are well-known equivalents of those shown in the patent for the performance of the functions to which they are respectively applied, in which case there is manifestly no inventive

faculty shown in the change, or it may be that, being shown by the successful operation of the patent the exact nature of the functions to be performed by a part of the patented device, the infringer, by the use of his inventive faculty, hits upon something as a substitute which will perform the same functions more completely and satisfactorily. In the latter case, he is a tributary inventor, but he is none the less an infringer if he uses the whole machine, with his substituted part to accomplish the same new result. The rule as to infringements of pioneer inventions which point the way to new products or results is analogous to that applied in cases of infringements of process patents, in which the discoverer is only required to point out one practical method of using his process, and is permitted to claim tribute from all who thereafter use the process, whether with his apparatus or with a different or improved means."

Westinghouse's first and second claims, because the general purpose and function of the structure as a whole was new, are entitled to such a construction, that if the defendants' general purpose be the same as his, and the separate purposes and operations of the separate parts of their combination be also the same, then infringement is established.

This is the rule laid down by this Court in *Cochrane vs. Deener*, 94 U. S., 780, in connection with Cochrane's Patents, not only for his process, but also for his *apparatus*, for purifying middlings of flour (Reissue No. 6594).

That case has some features of marked similarity to the present one in the fact that the apparatus was one whose method of operation "underlay" a revolution in the art of making purified flour "middlings," and in the fact that the form of apparatus described by the patentee had been greatly improved upon (and in *that* case by the defendants themselves, while in this case by Westinghouse himself); and in the fact that the generic claim for the apparatus first advanced by the patentee (and in *that* case granted) had been subsequently amended and restricted to the actual invention (in *that* case by reissue).

Yet, notwithstanding all this, this Court said :

"The first claim of Reissue No. 6594 is for the collecting air chamber (used for the purpose aforesaid), in combination with the bolter, air pipes and valves for feeding and delivering the meal without allowing the air to pass therewith. Now, although the

defendants use a flat bolter instead of a reel, and use different kind of valves for feeding and delivering the meal without allowing the air to pass, yet they employ the combination of devices described in this claim. They use the collecting chamber *for the same purpose* as that pointed out in the patent, and use it in connection with bolter, air pipes and valves for feeding and delivering the meal without allowing the air to pass therewith, *each effecting the same separate purpose, and all combined effecting the same general purpose*, which the like parts are intended to accomplish in Cochrane's bolting apparatus. Though some of the corresponding parts of the machinery designated in this combination are not the same in point of form in the two bolting apparatuses, and, *separately considered, could not be regarded as identical or conflicting*, yet, having the same purpose in the combination, and effecting that purpose in substantially the same manner, they are the equivalents of each other in that regard. The claim of the patent is *not confined to any particular form of apparatus*, but (in regard to the valves, for example) embraces generally any valves for feeding and delivering the meal without allowing the air to pass through. We are of opinion, therefore, that the combination here claimed is infringed by the apparatus used by the defendants.

"It is unnecessary to make a separate examination of the other claims embraced in the two patents under consideration. They are all susceptible of the same observations which we have made with regard to the first claim. In our opinion, the defendants do infringe them."

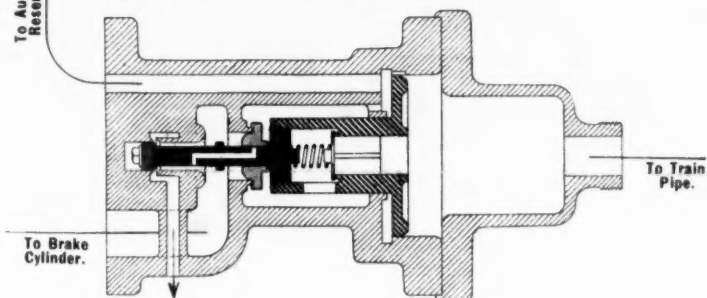
Such is the case here.

The defendants manufacture and sell a brake mechanism (shown in its three positions in Drawing 14 opposite), which combines a train pipe, auxiliary reservoir, brake cylinder and a triple valve. The piston of this triple valve controls two valves (and their ports) for admitting air to the brake cylinder, one (the slide valve, with its port *i j k*) for admitting air from the auxiliary reservoir for most (if not *all*) "service" uses, and the other (valve 22), or "auxiliary" valve for admitting train-pipe air for emergency use. The purpose and object of their structure is admittedly identical with that of Westinghouse's patent. Also the separate purposes and functions and operations of the corresponding parts of defendants' device are the same as those of Westinghouse.

The preliminary traverse of the defendants' piston controls and opens the first-mentioned or "service" valve (slide valve *i j k*), and the "further traverse" of the piston controls and opens the second or "emergency" valve (valve 22).

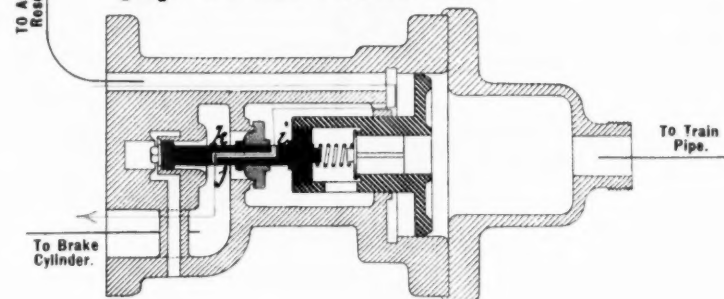
To Auxiliary
Reservoir.

14—Release (Brakes Off).



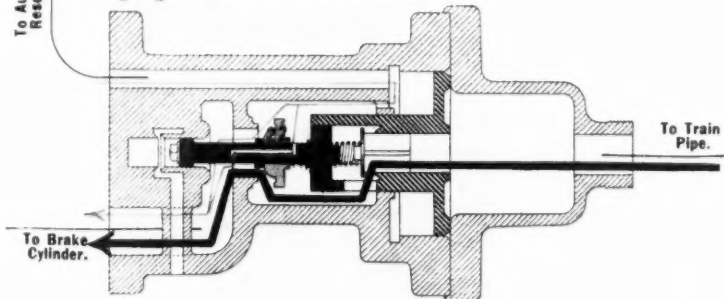
To Auxiliary
Reservoir.

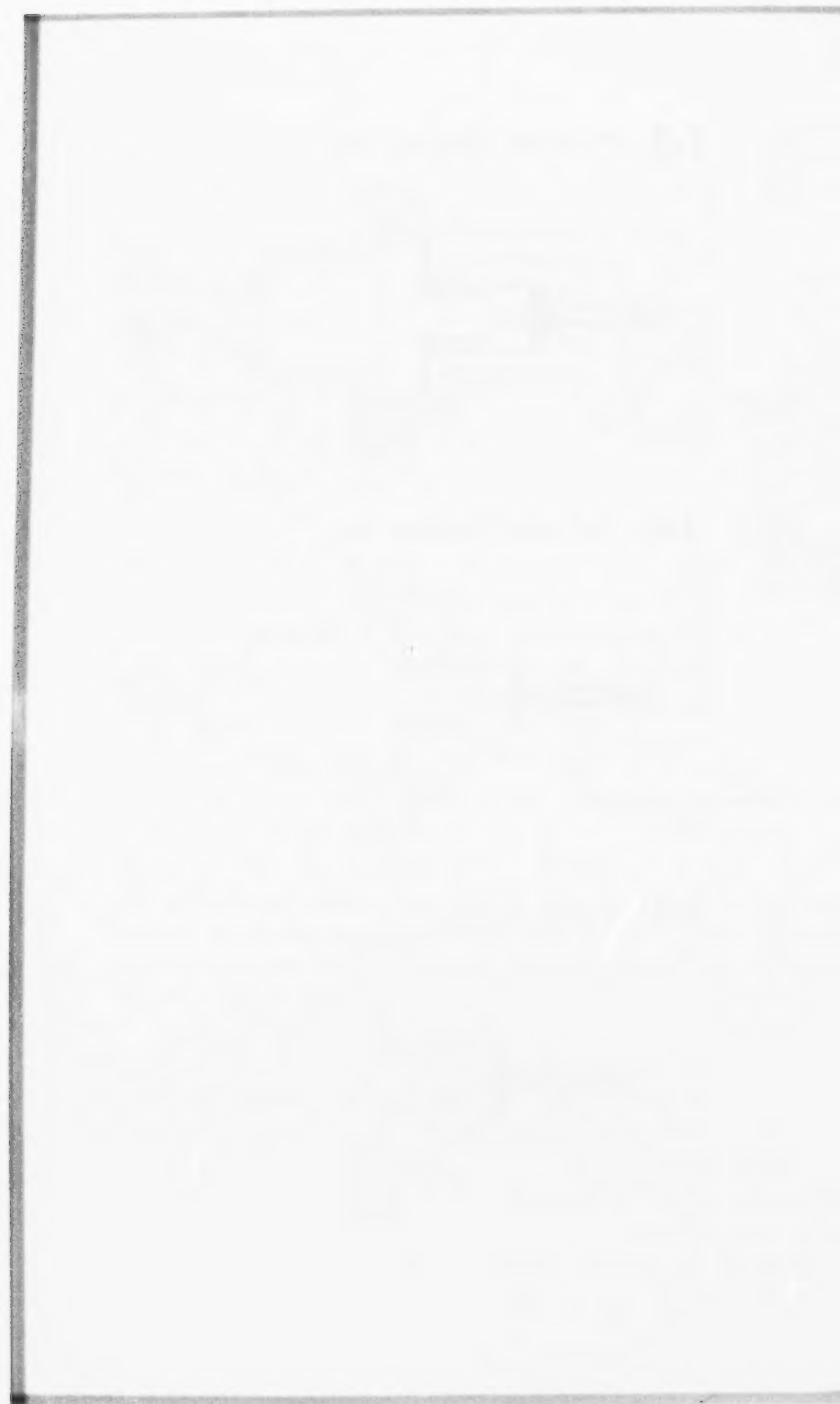
14—Service Application.



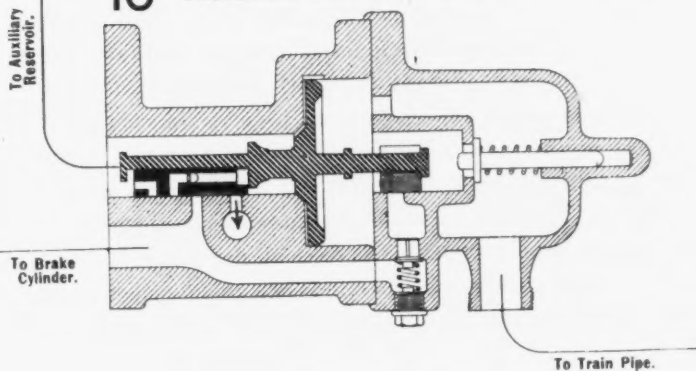
To Auxiliary
Reservoir.

14—Quick Action.

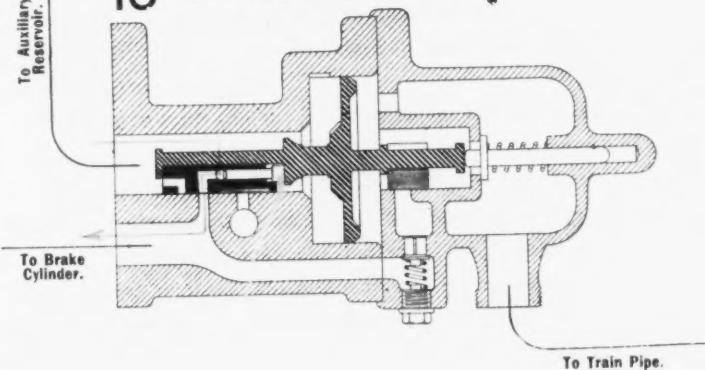




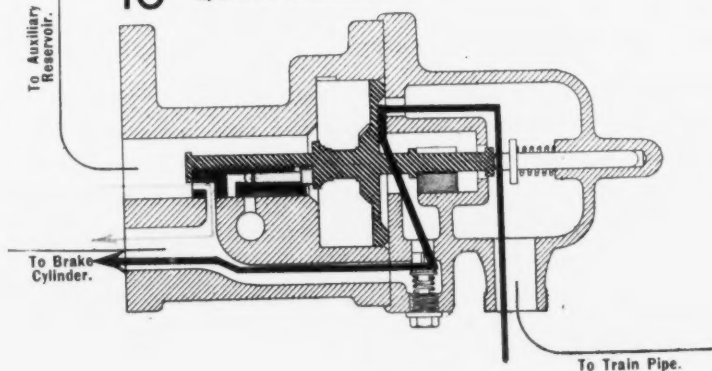
10—Release (Brakes Off).



10—Service Application.



10—Quick Action.





This is the identical action of Westinghouse.

Thus we have a clear case of infringement within the rule laid down in *Cochrane vs. Deener*, in that the "general purpose" of the whole combination of devices is the same as that of the patentee's, and the "separate purpose" of the separate parts is the same as the like parts of the patentee's device, and the purpose in each is effected "in substantially the same manner;" and this constitutes infringement in the case of a pioneer patent, although some of the corresponding parts of the machinery "are not the same in point of form," and, "separately considered, would not be regarded as identical or conflicting."

We have shown, in our prior briefs (Principal Brief, pp. 60-69; Supplemental Brief, pp. 6-14), by a careful analysis of the separate features of the defendants' valves, that even upon a narrower construction of Westinghouse's claims, the defendants' devices are clearly equivalents to his.

They have built (as we have there shown) upon one old form of Westinghouse triple valve (Patent No. 141,685) instead of upon his other form of triple valve (Patent No. 220,556) and have reversed the position of some parts, and altered the form of others. Defendants' piston, by its further traverse, *pulls* the emergency valve (valve 22) off its seat, while Westinghouse *pushes* a valve off, by a like motion. But, under clever disguises, all of Westinghouse's parts are to be seen, and every function and mode of operation is accomplished.

This will be clearly apparent from a careful comparison of the Drawing 14 of defendants' valve with drawing of Westinghouse 10 on the opposite page (see analysis in Principal Brief, pp. 64, 65).

No matter, then, how the separate parts may differ in form from those of Westinghouse, and no matter whether the valves, as valves, may be "poppet" valves instead of "slide" valves, or *vice versa*; and no matter whether the passage for train-pipe air be *through* the piston and case of the triple-valve, instead of *at the side of it*. The general purpose of the mechanism, as a whole, is the same, and is effected in substantially the same manner, and the separate

purpose of each separate part with reference to the others is also the same (even although they may have some additional functions also); and infringement of such a patent as that of Westinghouse is, therefore, clearly demonstrated.

As was said by the Circuit Court of Appeals (9th Circuit) in *Von Schindt vs. Bowers* (80 F. R., 121, 148):

"The record shows that the complainant was the first to combine these elements at all, and that the functions performed by his machine so constructed were entirely new. Hence, he had the right to make the broad and generic claim [embodied in Claim 10] without any limitation as to the form of construction of the particular elements, and all subsequent machines which employ substantially the same means to accomplish the same result are infringements, notwithstanding the subsequent machine may contain improvements in separate mechanism which go to make up the machine."

In the foregoing discussion we have endeavored to follow the lines indicated in the memorandum of this Court of January 24, but we also submit that, even upon much more rigid principles of construction of the patent in suit, infringement is clearly established.

In our former briefs we have dealt, we believe, with each and all of the positions advanced by the defendants, and we hope that we have successfully controverted them; and we have shown, by a series of illustrative drawings, that each and every change of position or shape of parts which has been adopted by the defendants is a mere equivalent, and a known equivalent, for the corresponding part of the Westinghouse device.

In our view "the purpose, principle and operation of the machines are the same" (*Consolidated Cable Co. vs. Pacific Cable Co.*, 53 F. R., p. 385), and the patent in suit is entitled, by virtue of the revolution which it has wrought, and the benefits which it has conferred, to such a "comprehensive construction" (*Norton vs. Wheaton*, 57 F. R., 927) as will fully and adequately protect the inventor and his assignees.

Respectfully submitted,

GEORGE H. CHRISTY.

FREDERIC H. BETTS,

Counsel for Respondents.

Errors in Appellee's Brief on Second Argument.

Outside of errors of argument, the Boyden brief, on reargument, contains numerous errors of incidental statement or recital, a few of which may be briefly noted.

1st. Page 8, line 4, from bottom, denial is made that in defendants' triple valve, *train-pipe* air goes to the brake cylinder "*through any separate and independent passageway.*"

This is erroneous. Defendants' quick-action triple valve has a "separate and independent passageway," F, *through the triple valve piston*, which is opened when and only when *train-pipe* air is to be admitted to the brake cylinder for purposes of quick action (see lower drawing, facing p. 40 of first Westinghouse brief).

2d. Page 10, lines 2-7, do not correctly state the Commissioner's duty in the case in hand. When Boyden's later application was properly filed, all the Commissioner had to do was to determine whether the *particular combinations* of the claims so submitted were to be found in the prior art. Whether those *particular combinations* were based on or included the subject matter of inventions previously patented to somebody else is a question which belongs to the Courts and not to the Commissioner, under Act of Congress. The Commissioner could not pass on that question, and if he did his action would be nugatory, as *ultra vires*.

3d. Page 18: It is represented that the apparatus of the patent in suit, "although it is an operative device," "did not meet the public demand," etc.

This is erroneous. It *did* meet the public demand, although, like all primary forms of invention, it was subsequently improved upon. Two thousand of them were made and sold and went into public use.

Westinghouse Rec., pp. 305, 306, x-Qs. 485, 486.

This charge has been repeatedly disposed of in every litigation, and the proofs on this subject and the decisions of the Courts thereon are fully dealt with in our principal brief (pp. 33-38). A

similar contention was advanced in the Circuit Court of Appeals for the Ninth Circuit in *Von Schmilt vs. Bowers*, 80 F. R., pp. 121-150.

In that case the Court said:

"The contention on the part of counsel for the appellant that no successful machine can be built and operated in accordance with the complainant's patents is not at all supported by the record, which contains abundant evidence to the effect that machines have been so built and have ever since been operated with very great success. The fact, if fact it be, that the first machine built by the complainant (called in the record the 'Davis machine') was not successful in its operation, is unimportant. As was well said by the Court, in answer to a similar objection in the case of *Mergenthaler Linotype Co. vs. Press Publishing Co.*, 57 F. R., 506:

"It would certainly be a novel doctrine to deny to an inventor the fruits of a broad invention because the machine which first embodied it was rudimentary in character and failed to do as good work as improved machines made subsequently. None of the great inventions could survive such a test."

To the same effect see *Cochrane vs. Deener*, 94 U. S., 780, 786-7.

4th. Page 21, line 5, by the words "*not because of any change in them*"—that is, in the old automatic triples—implies the assertion that Boyden in his present construction has adopted an old automatic triple *without any change therein*.

A valve 22, loose on its stem, so that it will *stay* on its seat during the *preliminary* movement of the triple-valve piston, as in service use, and will be unseated by the *further traverse* of the same piston, to admit air from a different source of pressure, as in quick-action use, is not found in any of the old automatic valves referred to. Making the stem itself into one valve, for one purpose, and a loose valve on the stem, for the other purpose, and operating it by the "further traverse" of the piston, was a "change" in matter of substance.

5th. The same error appears in the same page, lines 5 and 4 from the bottom, "without any material change therein."

6th. The entire argument of page 22 is misleading. Defendants' quick-action triple valve contains "*two [mechanically] separate and*

distinct machines" (just as much as Westinghouse's). The one consists of the triple piston, *in re* its preliminary traverse, opening the main-stem valve *i j k*, for "service" use; and the other consists of the piston, *in re* its further traverse, opening a separate and independent passageway F through the piston, and unseating an "additional" or an "auxiliary" valve 22, for venting train-pipe air directly to the brake cylinder in "quick action." The valve 22 and the passageway F are "additional members," and, in effect, constitute "another machine" as much as do the corresponding parts of Westinghouse.

7th. On page 24 an erroneous meaning is attributed to the word "*directly*." As this word is used by Westinghouse, it draws a distinction between the air which is *previously stored* in the auxiliary reservoir, and there held for use, and the air which is *not* so stored and held, but travels at once, or "*directly*," from train pipe to brake cylinder. Observing this distinction the word "*directly*" applies equally to the Westinghouse patented apparatus and to the Boyden infringing apparatus.

8th. "Reasoning by exclusion" (p. 25) is a method of reasoning which the Courts have never yet adopted in dealing with novel meritorious inventions.

9th. Lower on the same page (25) the allusion to "*mechanism integral therewith*" involves *apparently* an effort to get this Court to pass on an issue which does not arise in this case. Defendants' valve 22 is not "integral" with valve *i, j, k*. It is a different, and an "auxiliary" valve."

10th. The assumption that an erasure is always a disclaimer (p. 26) is not well founded in law. We have discussed this elsewhere.

11th. The "integral" issue, which, as already stated, is not involved in this case, is again made the basis of an effort at argument on page 27.

12th. We have never contended, and do not now contend, that "*remaining claims or any substituted claim*" shall receive "a construction or interpretation which shall be tantamount in scope and comprehensiveness to the original and erased statement and first claim" (B. brief, p. 28).

The original and erased first claim *in terms* covered the valve of the 1883 Boyden Patent. The present claims do not. And right there lies the distinction in respect of the proper legal construction of the claims as they now stand.

13th. The Circuit Judge did not assume that "such 'further' traverse was *per se* new" (p. 31). He found what was true, that it was new *in re* its work of *admitting train pipe air* to the brake cylinder.

14th. The "integral" issue is again worked in as the basis of the argument (p. 34).

15th. Assertion is again made (p. 35) that "defendants' device has no additional passageway at all," and no "auxiliary or other valve," etc.

We have already pointed out the passageway F through the triple piston is an "additional passageway," and that 22 is an "auxiliary" valve.

This error, repeated over and over again, runs through the entire Boyden brief, and it would unduly lengthen these notes to point it out wherever it occurs.

16th. It may be noted that the alleged analogies between *Gill vs. Wells* (pp. 43-54) and the case at bar are wholly suppositions. Infringement was denied in *Gill vs. Wells*, because (1st) the patent was not of a pioneer nature; (2d) the defendant "entirely omitted" an express element (guiding devices) of the patentee's claim *and used no equivalent*. Analogies are of but little force at best, and when *wholly imaginary* it is difficult to see how they can have any force at all.

17th. What is said of the lower drawings facing pages 64, 65, and entitled, "The Old Poppet Form of Triple Valve," *seems* to assert that a valve 22, *loosely* mounted on the stem (also made into a valve) of a triple-valve piston was old in the air brake art. *This is not true, nor is there any evidence in the case showing or tending to show that it is true.* Hence, the argument based thereon, and running through several following pages, is fallacious.

A poppet valve *fixedly secured* to the piston stem, so that the valve would open or close with *every* movement of the piston, was old, and constituted the main valve. When defendants made that valve *loose* on its stem, and so that it would be opened only by the "further traverse" of the piston, and made it "auxiliary" to the main valve *i, j, k* (or 40), it became an "auxiliary" quick-action valve, "additional" to the main valve, and, as such, it became mechanically and operatively "an additional member," operated by the "further traverse" of the piston, so as to open an additional passage F, directly from the train pipe to the brake cylinder—the passageway F thus being the other "additional member."

18th. The facts as to the presence in Westinghouse of what is in substance the partition 9, is presented in both of our prior briefs (Original, pp. 100-106 ; Supplemental, p. 12). Boyden is not the inventor of a *choke* for auxiliary reservoir pressure. That is in every quick-action valve ever made.

19th. The assertion (p. 79) that the Boyden piston "performs *only one* function" is not well founded. It performs *one* function during its preliminary traverse in that it opens the main valve *i, j, k* (40), the valve 22 then remaining on its seat. It performs *another* function when, in its "further traverse," it unseats the valve 22, which latter thereby acts as an "auxiliary" valve. The passageway F then opens, and the "new function" of the Westinghouse Patent is then performed.

20th. The effort (pp. 84, 85) to ally defendants' present appa-

ratus with that of the Boyden 1883 Patent ignores an important difference.

The passageway F in the present valve of defendants is not "*always open one way*." In "*service*" use it is *always closed*. Westinghouse disclaimed the former, but not the latter. Defendants' present valve contains the latter and not the former. The Boyden brief carefully ignores this important difference.

21st. "Differential pressures" between piston chamber and main valve chamber (pp. 85, 86) are of no importance. Both are small. The forces which *do the work* are *auxiliary reservoir* air and *train pipe* air. As between *these forces*, Westinghouse has the same differential pressures which Boyden has, and for the same purposes, and secured in the same way—by admitting *auxiliary reservoir* pressure through a *small* port, and *train-pipe* pressure through a *large* port. The Boyden brief admits as much when it says (p. 85, near bottom): "Of course, all triple valves in operating must have differential pressure."

